

Chapter 11

Maintenance and Troubleshooting

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Corrective Maintenance Troubleshooting

Table 11-1 provides a list of operational problems that can be encountered when you are operating the instrument. Listed with each problem is the corrective action.

Table 11-1. Corrective Maintenance Troubleshooting.

PROBLEM	ACTION
Low gas pressure	The gas bottle is empty. Replace the gas bottle. Calibrate the instrument after you replace the gas bottle (see the <i>Calibration</i> chapter). There is a hole or pinch in the gas line. Straighten the gas line, or if necessary replace it.
The cylinder in the instrument is not working.	The cylinder raises and lowers the sample plate. The instrument uses gas as part of the system hydraulics which causes the cylinder to move. The gas bottle is empty causing low gas pressure. Replace the gas bottle. Calibrate the instrument after you replace the gas bottle (see the <i>Calibration</i> chapter). There is a hole or pinch in the gas line. Straighten the gas line, or if necessary replace it. The cylinder is broken. Call your technical service engineer.
The instrument has gone off line during an acquisition.	Power to the instrument was inadvertently turned off during an acquisition. Restart the acquisition. The image is periodically saved to the hard disk, so you may be able to recover some of your data.
Error light on.	A system error has occurred during an acquisition. Check the screen for an error message. Correct the error condition.

Table 11-1. Corrective Maintenance Troubleshooting, Continued.

PROBLEM	ACTION
Sample cover not detected by the system.	An error has been detected in the sample drawer. The sample cover may be missing or fitted incorrectly. Open the sample drawer. If the sample cover is missing, place the sample cover provided by Packard over the sample. Secure the cover to the sample plate. If the sample cover is present, check to see that it is secured to the sample plate.
Sample cover torn.	Do not use any sample covers that are torn. Use another sample cover. Restart the acquisition.
No display.	Check the cable from the computer to the monitor. Check that both the computer and the monitor power switches are on. Check that the instrument is on.
Image appears blurred.	Check sample cover. It may be incorrectly placed over the sample.
No printout.	Check that the printer power switch is on. Make sure that the printer is online and that there is a supply of paper. Check the cable from the printer to the computer.

System Message Troubleshooting

The following messages are displayed on the screen as a source of information. The messages appear when the system has performed a specific task, or to help identify the potential problem.

Each message put out by the system is identified and described. Listed with each message is the associated corrective action. If the corrective action does not remedy the situation and the error recurs, you should call your technical service engineer (TSE). Give your TSE the exact message and the steps you followed preceding the display of the message.

Table 11-2. System Message Troubleshooting.

MESSAGE	COMMENT and ACTION
Computer Power Failure During Acquisition	Power to the computer was inadvertently turned off during an acquisition.
Could Not Initialize DSP	An error has been encountered prior to an acquisition. Start a new acquisition.
Could Not Initialize Serial Communication	An error has been encountered during system initialization. The instrument could be off-line or the optic cables connecting the computer to the instrument may be loose or incorrectly attached.
Could Not Load DSP Source Code	An error has been encountered prior to an acquisition. Start a new acquisition.
Could Not Load The Sample	An error has been encountered prior to an acquisition. Start a new acquisition.
Could Not Read DSP Source Code	An error has been encountered prior to an acquisition. Leave and reenter Windows. Start a new acquisition.

Table 11-2. System Message Troubleshooting, Continued.

MESSAGE	COMMENT and ACTION
Cylinder Error	The cylinder is malfunctioning. The cylinder raises and lowers the sample plate. The instrument uses gas as part of the system hydraulics which causes the cylinder to move. The gas line may be crimped. Replace the gas bottle if it is empty. Calibrate the system after you replace the gas bottle (see the <i>Calibration</i> chapter).
DSP Failed to Process Event	An error has been encountered during an acquisition. Data may be corrupted. Continue with the current acquisition or start a new acquisition.
DSP in Hold State	An error has been encountered during an acquisition. Data may be corrupted. Continue with the current acquisition or start a new acquisition.
DSP Memory Refresh Failure	An error has been encountered during an acquisition. Data may be corrupted. Continue with the current acquisition or start a new acquisition.
Failed Step 1 of Calibration Failed Step 2 of Calibration Failed Step 3 of Calibration	An error has been encountered during calibration. Open the sample drawer and check the calibration plate. It may be incorrectly fitted on the sample plate or the sample cover may not be secured to the sample plate. Attempt the calibration again.

Table 11-2. System Message Troubleshooting, Continued.

MESSAGE	COMMENT and ACTION
FIFO Failed to Empty	An error has been encountered during an acquisition. Data may be corrupted. Continue with the current acquisition or start a new acquisition.
FIFO Suffered an Overflow	An error has been encountered during an acquisition. Data may be corrupted. Continue with the current acquisition or start a new acquisition.
High Voltage Trip	An error has been encountered during an acquisition. Open the sample drawer and check to see that the sample has been loaded correctly. The sample cover may not be secured to the sample plate. Continue with the acquisition or start a new acquisition.
Instrument-Computer Communication Error	An error has been encountered during acquisition. Check the optic cables that connect the computer to the instrument. Continue with the current acquisition or start a new acquisition.
Instrument Off-Line	The computer is on but the instrument is off. Turn the power on to the instrument. The power switch is located on the back panel of the instrument. If the instrument is on, check the optical cables.

Table 11-2. System Message Troubleshooting, Continued.

MESSAGE	COMMENT and ACTION
Internal Data Communication Error	An error has been encountered during an acquisition. Data may be corrupted. Continue with the current acquisition or start a new acquisition.
Sample Cover Not Detected	An error has been detected in the sample drawer. The sample cover may be missing or fitted incorrectly. Open the sample drawer. If the sample cover is missing, place the sample cover provided by Packard over the sample. Secure the cover to the sample plate. If the sample cover is present, check to see that it is secured to the sample plate.
Sample Drawer Not Detected as Closed	The sample drawer may not be closed. Close the sample drawer.
Serial Communication Error	The serial optic cables connecting the computer to the instrument may be loose.
System Gas Flow Error	An error has been detected in the gas system. The instrument does not detect the proper amount of gas flow through the detector. The gas line may be crimped. Replace the gas bottle if it is empty. Calibrate the system after you replace the gas bottle (see the <i>Calibration</i> chapter).

Table 11-2. System Message Troubleshooting, Continued.

MESSAGE	COMMENT and ACTION
System Gas Pressure Error	An error has been detected in the gas system. The instrument does not detect the proper amount of gas flow through the detector. The gas line may be crimped. Replace the gas bottle if it is empty. Calibrate the system after you replace the gas bottle (see the <i>Calibration</i> chapter).
The InstantImager is Busy	The InstantImager is currently acquiring an image. Wait until the current acquisition is completed to start your acquisition.

Replacing the Gas Bottle

The gas bottle should be replaced when it reaches 100 psi (pounds per square inch) or 690 kPa (kilo Pascals). Before you replace the gas bottle, you should turn off all power to the instrument. This will prevent air from entering the system. After you reconnect the new gas bottle, the normal operating pressure should be 32 to 35 psi (220 to 240 kPa).

How soon you can use the instrument after changing the bottle will be determined by the presence or absence of counting gas in the system. If you are replacing a bottle of counting gas before the old bottle runs completely out, the detector should still be filled with the counting gas and you can calibrate the system and begin to acquire images immediately. We recommend that you calibrate the instrument before each acquisition for the first 24 hours after changing gas bottles. You should let no more than 120 minutes lapse between each calibration. Each acquisition, therefore, should run no longer than 2 hours during this time.

You should never allow the system to sit without either counting gas or CO₂ pressurizing the detector. If you have stored the system on CO₂ for any length of time as described in Appendix A, you should not use the instrument for at least 3 to 5 days after the system has been reconnected to counting gas. After this period of time, you can calibrate the system and begin to acquire images. You should calibrate the instrument before each acquisition for the first 24 hours of acquisitions. You should let no more than 120 minutes lapse between each calibration. Each acquisition, therefore, should run no longer than 2 hours during this first 24 hour period.

If you have turned off the gas supply to the system for any length of time, air will have entered the system. Connect the counting gas to the system, but do not use the system for at least 3 to 5 days. After this time, calibrate the system and if you have any problems calibrating, contact your technical service representative to determine if irreparable damage to the detector has occurred due to the lack of gas.

See the *Calibration* chapter for more information on how to calibrate the instrument.

Gas Requirements

 **Note:** *The detector must remain filled either with counting gas or CO₂ at all times.*

Table 11-3 describes the recommended InstantImager gas requirements including the composition of the gas bottle contents, tolerance factors, and purity percentages.

Table 11-4 describes the composition (ppm) of the residual impurities found in the Carbon Dioxide and the Isobutane.

Table 11-3. Gas Requirements.

Gas	% Total Composition (of gas bottle)	% Tolerance	% Purity
Carbon Dioxide	2.5%	-5%/+10%	Bone dry 99.8%
Isobutane	1.0%	-5%/+5%	Chemically pure 99.0%
Argon	96.5% or remainder of gas in bottle	NA	Pre-purified 99.98%

Table 11-4. Impurities.

Gas	Impurities (ppm)
Carbon Dioxide and Isobutane	< 100-150 ppm of air < 5-50 ppm H ₂ O

Gas Pressure

Normal operating pressure: 32 to 35 psi (220 to 240 kPa).

Maximum operating pressure: 50 psi (345 kPa).

Gas Bottle Hazards

The gas is under pressure in the cylinder. Precautions should be taken to prevent the bottle from falling. The gas bottle should never be transported without the main valve cover.

Electrical and Mechanical Hazards

The same precautions you take when using any electrical equipment should be observed when using the instrument. Do not touch any switches or outlets with wet hands. Switch the instrument off before disconnecting the power cord. Unplug the instrument prior to cleaning up major spills.

Electrical servicing should be performed only by qualified personnel.

Normal system operations pose no mechanical hazards to you. You should never reach into the sample drawer.

Decontaminating Sample Drawer Accessories

It is recommended that you wipe off the sample plate from time to time. You should also clean the sample tray as often as necessary. Use a standard decontamination solution.

You can also decontaminate the sample cover and the airbag. Be careful that you do not apply decontamination solution to the side of the cover that will be in contact with the surface of the detector.

When you clean the airbag with decontamination solution be careful that you do not remove the silk screening.

If the sample support pad becomes contaminated or damaged, it should be discarded.

Starting and Stopping the Instrument

You should never have to turn off the instrument. However, power to the instrument can be controlled by pressing the ON/OFF switch located on the back panel of the instrument. A separate switch on the computer controls power to that unit. This enables you to use the computer when the instrument is powered off.

Once the instrument has been turned on, you should let it warm up for five minutes. This allows the instrument to stabilize and for the gas to circulate throughout the system. No acquisitions will be allowed during the five minute warmup.

Adding New Users

Each user of the InstantImager can have their own program icon on the Window's Start Menu or Program Manager. Each icon that is created can start an individual instance of the InstantImager program. Each instance of the program saves all data and other files to the user's specific directory on the hard disk.

How To Add a User

Adding a new user is simple, all you have to do is:

1. Access the **User Information** window (Figure 11-2) from the **Imager Users** window.
2. Specify the user's name (the user's name is automatically used as the directory name).
3. Optionally specify the user's password (see *User Administration* below).
4. Specify the total number of bytes allocated to the user on the hard disk.
5. Select **OK**.

This procedure creates a personalized icon for each individual user of the InstantImager. Accordingly, no user within the system will be able to save data to another user's directory.

To add a new user:

- ☐ Select the "Imager Users" icon from the Windows Start Menu or Program Manager.

The **Imager Users** window is displayed (Figure 11-1).

- ☐ Select **NEW**.

The **User Information** window is displayed (Figure 11-2).

- ☐ Enter the user's name in the "Name" entry box.
- ☐ Enter the user's password in the "Password" entry box. An asterisk (*) will appear for each keystroke. The system will prompt you to confirm the password by reentering it.
- ☐ Enter the number of bytes allocated to the user on the hard disk in the "Quota" entry box.
- ☐ Select **OK**. The user's selectable icon and directory are created.

Note that the user's name is automatically used as the directory name. Once created, you can change the directory name.

 **Note:** *If you are not authorized to enter a password, then the "Password" entry box will be grayed out.*

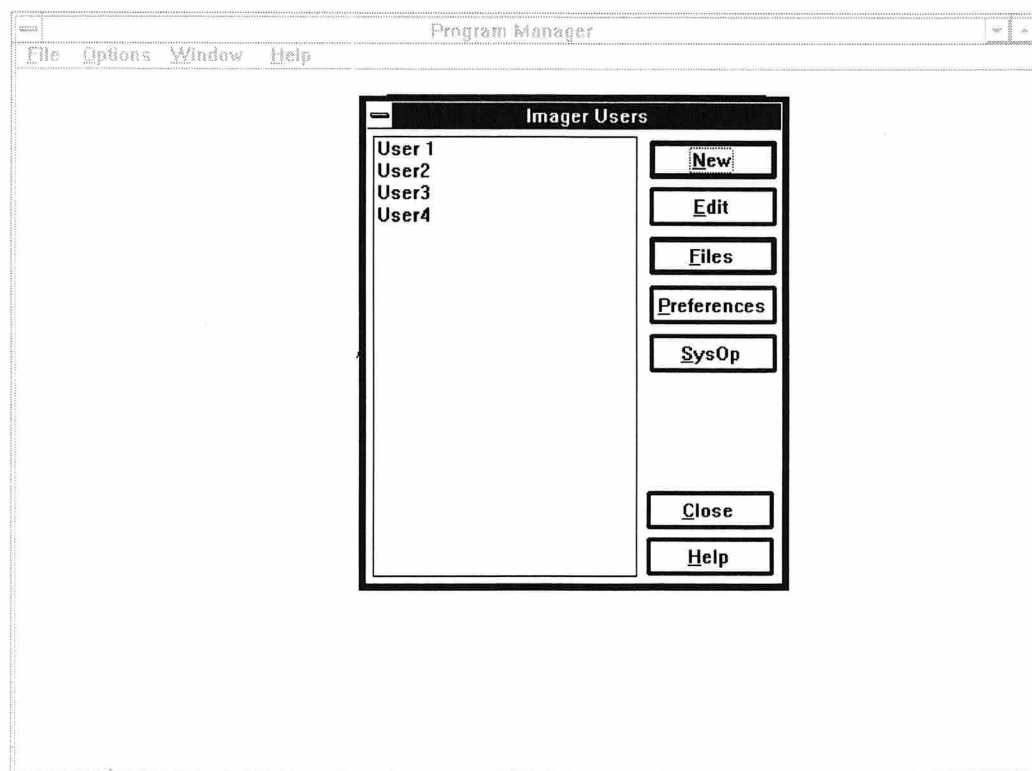


Figure 11-1. Imager Users Window.



Figure 11-2. User Information Window.

Editing a User

To edit a user:

- ☐ Select **EDIT** from the **Imager Users** window.

The **User Information** window is displayed (Figure 11-2).

Optionally change the information at the **User Information** window.

Select **OK** to save any changes.

Viewing User Images

The images (.IMG files) located in each user directory can be displayed in a list. You can view each image in the list.

To view an image:

- ☐ Select a user from the **Imager Users** window.
- ☐ Select **FILES**.

The **Users Images** window is displayed (Figure 11-3).

- ☐ Select a .IMG file from the list.
- ☐ Select **VIEW**.

The entire image is displayed at the **InstantImager** window.

Each selection in the **Users Images** window is described below.

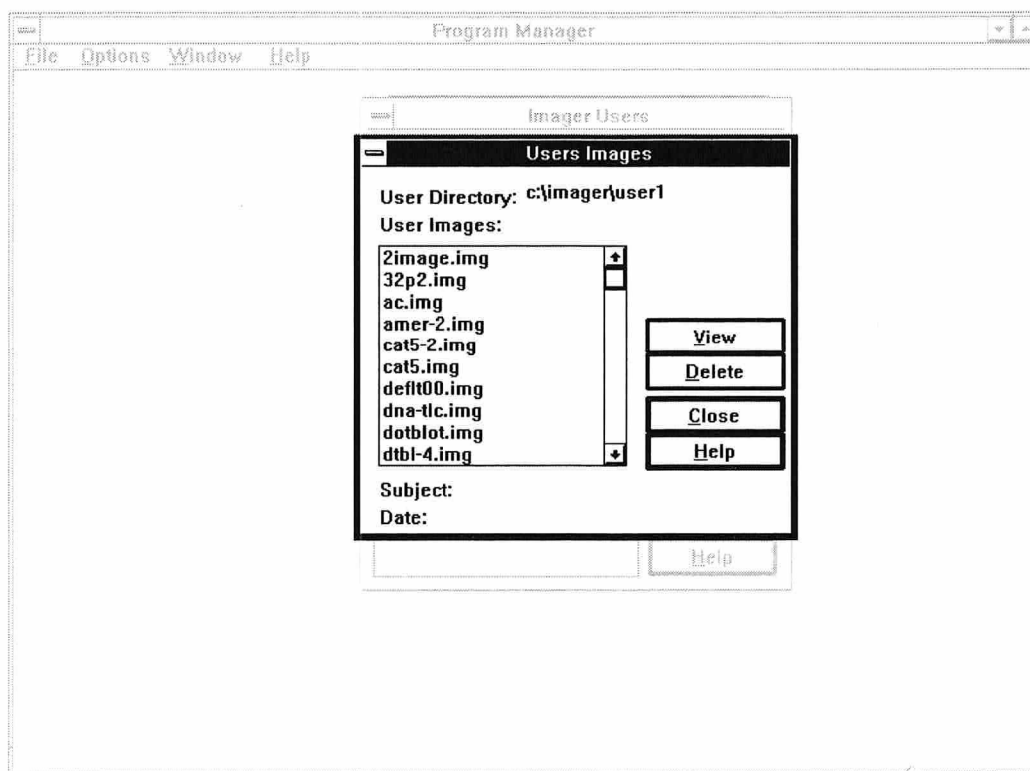


Figure 11-3. Users Images Window.

<u>SELECTION</u>	<u>DESCRIPTION OF USE</u>
VIEW	Enables you to view the selected image.
DELETE	Enables you to delete the selected .IMG file from the directory.
CLOSE	Removes the window from view.
HELP	Displays online help.

Deleting Images

You can delete images from a specified user directory. Images can be selected and deleted at the **Users Images** window (Figure 11-3). The list of images at this window belong exclusively to the user directory you select at the **Imager Users** window (Figure 11-1). (See the section *Viewing User Images* above for instructions on how to access the **Users Images** window.)

Once you have accessed the window, you can select and delete an image:

- ☐ Use the mouse to point to a file (from the list) and click the left mouse button. This highlights the filename and represents the image that will be deleted.
- ☐ Click on **DELETE**.

The following question is displayed to verify that you want to delete the file:

“Are you sure that you want to delete <filename>?”

Where <filename> is the image file to be deleted.

- ☐ Select **OK** to delete the image file.

Both the .IMG and .ANA files of the image are deleted from the disk. The .IMG file contains the image. The .ANA file contains analysis templates and annotations that are overlaid on the image, as well as the current image settings.

Setting User Preferences

Using the **User Preferences** window (Figure 11-4), you can specify the following information for a specific InstantImager user:

- Template color.
- Annotation color.
- Helpline color.
- The frequency of image acquisition updates.
- The number of colors used to display the image.

These selections are called user preferences.

To display the **User Preferences** window:

- ☐ Select a user at the **Imager Users** window.
- ☐ Select **PREFERENCES**.

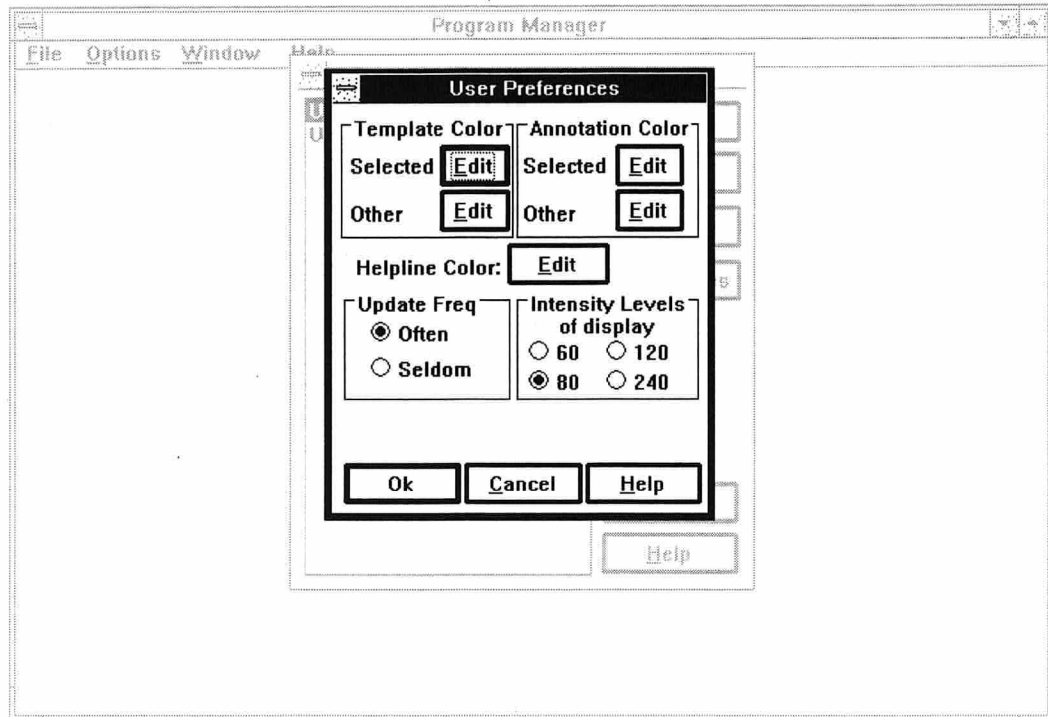


Figure 11-4. User Preferences Window.

Specify Colors

You can specify the color of templates, annotations, and the helpline. You can select templates and annotations on the screen. Therefore, you can specify the color of the selected items ("Selected") as well as the color of the remaining items that are not selected ("Other").

To specify a color (Template/Annotation/Helpline):

- ☐ Select the appropriate **EDIT** button.

The **Color** window is displayed. Select a color for the item. Select **OK** to save the setting.

Update Frequency

During an acquisition the image is periodically updated to the screen. It is possible to change the frequency of these updates.

Selecting “Often” means that an update will occur every 15 seconds during an acquisition.

Selecting “Seldom” will set the update frequency value to 15. This means that the first update will occur 15 seconds after the acquisition begins and increase by 1 second for every 15 seconds that elapse from the start of the acquisition. The net effect is that each update is performed at ever increasing intervals during the acquisition until a maximum interval of 5 minutes is reached.

Specify Intensity Level

You can specify the total number of colors (including shades of gray) used to display the image. Select 60, 80, 120, or 240 levels of display.

The palette that displays the bitmap of the image can contain up to 240 colors or shades of gray. If the number of colors is set for less than 240, there can be more than one instance of the InstantImager program running with independent display palettes.

Set the Intensity Levels at 240 if you do not expect to view images in more than one instance of the InstantImager at once. Set the Intensity Levels at 120 if you want to be able to view two images simultaneously in separate instances of the program with independent display palettes.

Save User Preferences

To save the preferences for the selected user:

- ☐ Select **OK**.

User Administration

Selecting **SYSOP** from the **Imager Users** window displays the **System Operator** window (Figure 11-5). This window enables the system administrator to:

- Assign the system password.
- Enable user password protection.
- Enable user password access.
- Enable usage logging.

Each of these functions are discussed below.

Only the system administrator or an authorized substitute can access the **System Operator** window. You must enter the system password in order to access this window. When you enter the password, asterisks (*) will appear for each keystroke.

The system administrator is responsible for assigning the system password (see *System Password*, below).

All of the users known to the system are listed to the left in the **System Operator** window under "Users."

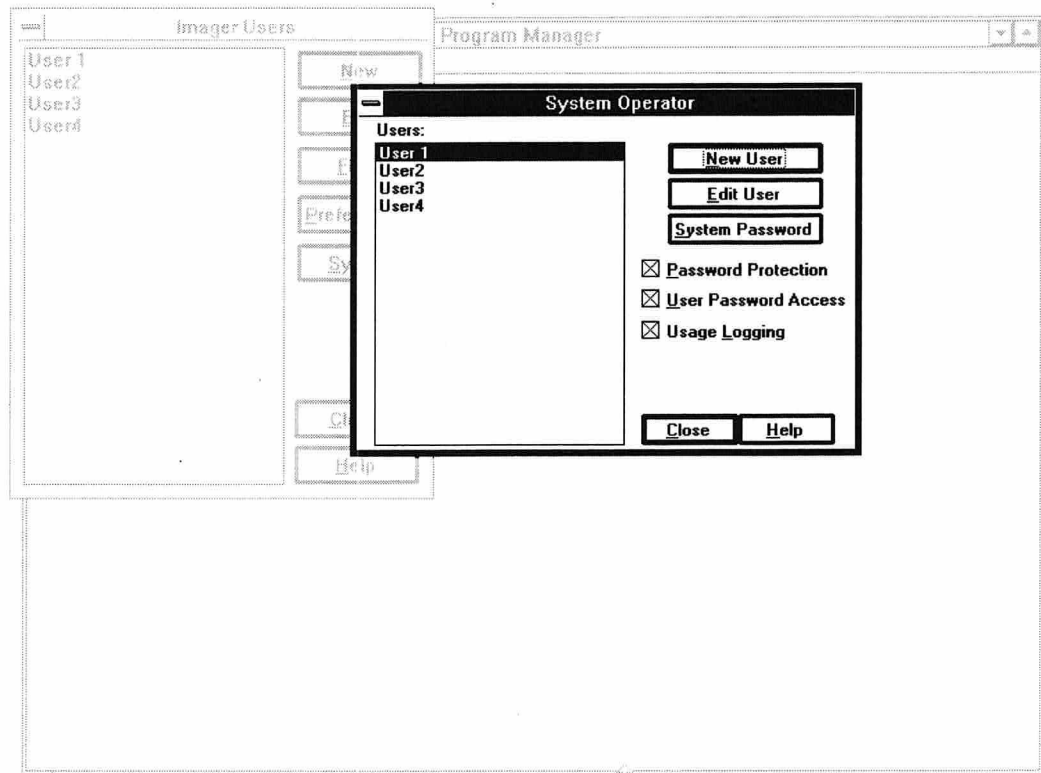


Figure 11-5. System Operator Window.

System Password

You need to enter a system password in order to access the **System Operator** window. You (the system administrator) can change the password.

 **Note:** The initial password will be "Packard".

To change the system password:

1. Select **SYSTEM PASSWORD**.
2. Enter the old password. Asterisks (*) will appear for each keystroke. Select **OK**.
3. Enter the new password. Select **OK**.
4. To confirm the new password, enter it again. Select **OK**.

The new password is now the system password. You must enter the newly assigned password in order to access the **System Operator** window.

The password can be changed at any time.

Password Protection

When this feature is selected, no acquisition can begin until the user enters his or her assigned password. Passwords for each user are assigned at the **User Information** window (see *Adding New Users*, above).

The system prompts each user to enter a password just after they select **OK** at the **Acquisition Start Parameters** window.

User Password Access

When this feature is selected, any user will be able to enter a password for a new user and change the password for an existing user. If this box is not selected, the "Password" entry box at the **User Information** window will be inactive (greyed out). In this case only the system administrator can assign passwords. This is done by selecting **NEW USER** or **EDIT USER** (with a user selected from the list) from the **System Operator** window.

Usage Logging

When this feature is selected, a record of all acquisitions will be maintained in a usage log file. This file will be named "usage???.txt"; where ?? is replaced by the last two digits of the current year. For example, all acquisitions in 1996 will be recorded in "usage96.txt". This file is then broken up into months labeled "[1-1996]", "[2-1996]", etc.

There will be two entries for each user that has performed an acquisition during the indicated month. These entries are:

- **User????Acquisitions:** Lists the number of acquisitions the user has performed.
- **User????Minutes:** Lists the total number of minutes the user has acquired.

???? is the user's name. Use any common text editor to access the usage log file.

Backing Up Images

You can archive the images in your directory to a backup disk. Both the .IMG and .ANA files of the image need to be copied to the backup disk. The .IMG file contains the image. The .ANA file contains analysis templates and annotations that are overlaid on the image, as well as the current image settings.

Once saved to disk, the same image files can be restored to your directory. Simply copy BOTH the .IMG and the .ANA files back into your user directory and you will be able to open it the next time you start the InstantQuant program.

Software Installation

This section explains how to install the InstantImager software. Before you do, the following software must be installed:

- DOS 5.02 (and higher)
- Microsoft Windows 3.1 (and higher)
- Superprint® 3.0 (and higher)

OR

- Windows 95

When Installing Windows

Windows should be set to run with a screen resolution of 800 x 600 and with 256 colors. You should also set Windows 3.1 to NOT use the Print Manager.

To turn off the Print Manager:

- ☐ Select the Control Panel icon from the Settings item in the **Main** group window.
- ☐ Turn off "Use Print Manager" from the **Printers** window (the X should NOT be displayed).
- ☐ Click the mouse outside the **Printers** window to save the selection.

How to Install the InstantImager Software

To install the InstantImager software from Windows:

1. Insert the installation disk labelled MASTER DISK 1 of 3 into the A drive or B drive.
2. Select **Run** from the Start Menu or **File** menu in the Program Manager.
3. Enter "A : i n s t a l l" (if disk is in drive A) or "B : i n s t a l l" (if disk is in drive B) at the Command line.
4. Select **OK**.
5. Select **Continue** from the **Packard Imager Setup** window.
6. Select the "Packard Detector:PACKARD.DLL" option at the **Installation Options** window. Select **Continue**.
7. Enter the imager's path at the **Get the Imager's Path** window (the recommended path will be displayed). Select **Continue**.
The software from disk 1 is installed to the selected directory.
8. When prompted, eject disk 1 from the drive and insert the installation disk labelled MASTER DISK 2 of 3 into the same drive.
9. Select **OK**.
The software from disk 2 is installed to the selected directory.
10. When prompted, eject disk 2 from the drive and insert the installation disk labelled MASTER DISK 3 of 3 into the same drive.
11. Select **OK**.
The software from disk 3 is installed to the selected directory.
12. Select **OK** to confirm the successful installation of the software. (This message also instructs you to calibrate your instrument. You calibrate the instrument in step 15 of this procedure.)
13. Select **OK** at the **Imager Setup** window. This window instructs you to reboot the system.
14. Press the <Ctrl>-<Alt>- keys simultaneously to reboot the system.
Final system configuration checks are performed to make sure that your system is set up correctly. If possible, all necessary changes will be made automatically. If the changes cannot be made automatically, then you will be prompted to take the necessary actions(s). See *High Memory and the DSP*, below.
15. Calibrate the instrument. (See the *Calibration* chapter for instructions.)

High Memory and the DSP

For the instrument to perform correctly, the high memory in your computer must be made available to the DSP. To facilitate this, your CONFIG.SYS file is updated after you reboot the computer. If you do not have a memory manager, the Microsoft Window's EMM386 memory manager is automatically installed into your CONFIG.SYS file. If a memory manager (other than EMM386) is present, then you will be instructed to access your CONFIG.SYS file and exclude the D000–DFFF segment. The DSP and your PC communicate data through the D000–DFFF segment of memory.

If your CONFIG.SYS file is modified, you will be informed to reboot the system by pressing the **<Ctrl>--<Alt>--** keys simultaneously.